



GLOUCESTER HARBOR CHARACTERIZATION: Environmental History, Human Influences, and Status of Marine Resources

Massachusetts Office of Coastal Zone Management
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

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TECHNICAL REPORT



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CONTRIBUTING AUTHORS

Anthony R. Wilbur

Massachusetts Office of Coastal Zone Management

Fara Courtney

Good Harbor Consulting

Robert P. Glenn

Massachusetts Division of Marine Fisheries

May 2004

Commonwealth of Massachusetts

Mitt Romney, Governor

Kerry Healey, Lieutenant Governor

Executive Office of Environmental Affairs

Ellen Roy Herzfelder, Secretary

Massachusetts Office of Coastal Zone Management

Tom Skinner, Director



Commonwealth of
Massachusetts



Executive Office of
Environmental Affairs



Massachusetts Office of
Coastal Zone Management



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The Massachusetts Office of Coastal
Zone Management (CZM)
251 Causeway Street, Suite 800
Boston, MA 02114-2136
(617) 626-1200

CZM Information Line - (617) 626-1212

CZM Web Site - www.mass.gov/czm

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Gloucester Harbor Characterization: Environmental History, Human Influences, and Status of Marine Resources

Massachusetts Office of Coastal Zone Management, Boston, Massachusetts

The heritage, history, and economic prosperity of the Commonwealth of Massachusetts are closely connected to the ocean. The relationship with the ocean is unmistakably pronounced in the harbors and ports scattered along the Massachusetts coastline. Harbors played a critical role in the establishment of successful and thriving communities in Massachusetts. Gloucester Harbor is America's oldest fishing port and has endured substantial changes in economic, cultural, and environmental conditions since the 15th century.

The sheltered embayment of what is now Gloucester Harbor was discovered by European explorers in 1606. Located on Cape Ann, Gloucester is surrounded by historically and contemporary productive fishing grounds of Massachusetts Bay. Gloucester Harbor has a fabulous landscape, ranging from the sandy beaches and rocky shoreline of the outer harbor to the working waterfront in the inner harbor. Current and traditional uses of the harbor's and Massachusetts Bay's marine resources, such as fishing industries, seafood processing operations, water-based tourism, and historical and cultural attractions, are found throughout the harbor. Gloucester Harbor did not always exist as a maritime port that supports a diversity of industries. The current shape of the harbor, condition of the economic environment, and status of the natural resources are the result of a 400-year history of human development and resource exploitation.

The harbor was inhabited by native Americans, and the protected waters were immediately recognized as a resource by European explorers. The sheltered harbor provided the foundation for the development of a productive working waterfront, and marine resources supported and sustained commercial and sustenance

fisheries for centuries. The harbor, fishing industries, and marine environmental quality have dramatically changed, since Gloucester was settled by Europeans in 1623. The importance of harbor and port infrastructure and marine resources, however, remain an important commodity to the maritime heritage, economic prosperity, and ecological sustainability of Massachusetts.

The Gloucester Harbor Characterization is a resource guide that describes human and natural resources of one of Massachusetts oldest and productive harbors. The resource guide is a tool to support resource management strategies and interdisciplinary planning by investigating and characterizing historic and current anthropogenic alterations and influences, present-day environmental quality, and marine resources in the harbor. The goals of this guide are to:

- (1) Integrate and synthesize data to describe the harbor environment. The assessment of key biological, physical, chemical, social, and economic features within the harbor documents the status of human and natural resources. The resource characterization is not an all-inclusive review of existing information but summarizes important features in the harbor. The assimilation of monitoring, survey, mapping, and research data that were collected for diverse reasons provides baseline information and identifies gaps in the understanding of Massachusetts coastal resources.
- (2) Establish a framework for data integration to characterize coastal waters. The analysis and description of a variety of regional and harbor data sources provides efficient access to human and natural resource information for coastal

communities, resource managers, and scientists. Evaluation of environmental and societal issues, ranging from local development decisions to national and global resource concerns, requires readily accessible information for effective marine resource management. A concerted characterization effort that supplies and distributes diverse coastal resource data supports the Commonwealth's coastal management efforts to conserve important environmental features and develop (or re-develop) working waterfronts.

- (3) Support harbor resource management, planning, and implementation. The characterization provides baseline information to evaluate management strategies (e.g., predicting impacts of existing and proposed activities), encourage innovative management plans, develop mitigation options, foster interagency and interdisciplinary planning, investigate spatial and temporal trends in environmental quality that are associated with human influences, and promote stewardship of human and natural resources. The harbor characterization contributes to the understanding of the marine environment and the influences of human activities and coastal development to environmental quality.

The Gloucester Harbor Characterization examines and describes the environmental history of development and human influences, characterizes current understanding of environmental quality, examines lobster fishing and lobster population structure, investigates fish community structure, and describes seafloor habitat. The following individual studies are formatted as discrete chapters:

Chapter 1: The environmental history and current characteristics of Gloucester Harbor

Chapter 2: Synthesis and review of environmental conditions in Gloucester Harbor

Chapter 3: Lobstering in Gloucester Harbor: Distribution, relative abundance, and population characteristics of American lobster (*Homarus americanus*)

Chapter 4: The relative abundance, distribution, composition, and life history characteristics of fishes in Gloucester Harbor

Chapter 5: Identification of the type and quality of Gloucester Harbor coastal and seafloor habitats: Synthesis of harbor and regional studies